We Claim:

1. An etch mixture for silicon comprising a fluorine-containing gas selected from the group consisting of SF_6, Si_2F_6 and SiF_4 together with HBr and oxygen.

2. An etch mixture according to claim 1 wherein the mixture additionally includes a noble gas.

3. An etch mixture according to claim 1 wherein the mixture contains SF_6.

4. An etch mixture according to claim 3 wherein the mixture additionally includes Si_2F_6 and SiF_4.

5. An etch mixture according to claim 3 wherein the volume ratio of HBr:SF_6 is 0.1 to 10.

6. An etch mixture according to claim 3 wherein the volume ratio of HBr and SF_6:O_2 is 0.1 to 10.

7. A method of etching deep, straight walled, rounded bottom openings in silicon comprising plasma etching a silicon substrate with an etch mixture comprising a fluorine-containing gas selected from the group consisting of SF_6, Si_2F_6 and SiF_4 together with HBr and O_2 in a plasma vacuum chamber, said silicon substrate mounted on a support electrode connected to an RF power source.

8. A method according to claim 7 wherein the fluorine-containing gas is SF_6.

9. A method according to claim 7 wherein the volume ratio of $HBr:SF_6$ is from 0.1 to 10.

10. A method according to claim 7 wherein the volume ratio of HBr and $SF_6:O_2$ is from 0.1 to 10.